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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,152	02/16/2001	Roy Emek	6727/01307US0	4283

7590 09/27/2004

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EXAMINER	
HIRL, JOSEPH P	

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/788,152	EMEK ET AL.	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 February 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *032701*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-65 are pending in this application.

Claim Objection

2. Applicant is advised that should claim 8 be found allowable, claim 9 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The "union of interim domains" is similar to "...set of relations."

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-31 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of the claim raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. While the application maybe trivial, claims 1-31 can be implemented with pencil and paper.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-65 are rejected under 35 U.S.C. 102(b) as being anticipated by Mackworth (Consistency in Networks of Relations, Artificial Intelligence, 1977, referred to as **Mackworth**).

Claims 1, 19

Mackworth anticipates receiving a set of variables having respective input domains and a set of relations among the variables (**Mackworth**, p 104, l 2-6); building a network of one or more hyper-arcs representative of the set of relations, each hyper-arc corresponding to one of the relations and linking nodes in the network corresponding to the variables that are subject to the relation (**Mackworth**, p 104, l 2-6; Examiner's Note (EN): see specification @ p 2 , l 17-28 for network terminology); for each of the hyper-arcs, assembling the variables in a hierarchy based on the relation corresponding to the hyper-arc (**Mackworth**, p 104, l 8-18); and reducing the input domains of the variables in the hierarchy, so as to determine respective output domains of the variables that are consistent with the relations (**Mackworth**, p 104, l 8-18; EN:

regarding three variables, **Mackworth**, p 104, l 18-24; such is D_i, D_j, D_k and related variables).

Claim 2

Mackworth anticipates assembling the variables comprises arranging the variables in a hierarchical graph, having vertices corresponding to the variables (**Mackworth**, p 104, l 2-6; EN: graphs have nodes and linkages and are axiomatically hierarchical).

Claim 3

Mackworth anticipates arranging the variables in the hierarchical graph comprises arranging the graph so as to have the form of one or more trees (**Mackworth**, p 102, l 6-8).

Claim 4

Mackworth anticipates reducing the input domains comprises reducing the input domains over each of the trees so as to find respective interim domains of the variables that are consistent with the relation over each of the trees, and combining the interim domains over all of they trees to determine the output domains (**Mackworth**, p 105, l 16-25; p 114, l 32).

Claims 5, 21, 52

Mackworth anticipates receiving a definition of the relations as a combination of operators, selected from a group of arithmetic, bitwise and logical operators, which are applied to the variables, and wherein arranging the variables in the graph comprises

inserting vertices in the graph corresponding to the operators, connecting the vertices corresponding to the variables (**Mackworth**, p 107, l 12-29; EN: such as a binary predicate; inserting vertices would follow related constraints or operations since there is a connected relationship).

Claims 6, 20, 26, 51, 57

Mackworth anticipates reducing the input domains comprises finding projections of the operators onto the domains of the variables in the graph (**Mackworth**, p 104, l 8-18; EN: constraints or predicates include operators that affect domains; artificial intelligence tasks are processor implemented).

Claims 7, 27

Mackworth anticipates receiving the set of variables comprises receiving an output variable and at least one input variable for each of the operators, and wherein finding the projections comprises projecting the domain of the at least one input variable of each of the operators onto the domain of the output variable thereof, and projecting the domain of the output variable of each of the operators onto the domain of the at least one input variable thereof (**Mackworth**, p 104, l 2-18; EN: a forward projection axiomatically establishes a reverse projection on at least one input variable...they have to be connected).

Claims 8, 39

Mackworth anticipates wherein building the network of the hyper-arcs comprises representing the set of relations as a disjunction of multiple relations, with one of the hyper-arcs corresponding respectively to each of the relations, and wherein

determining the respective output domains comprises determining interim domains of the variables for each of the hyper-arcs, and taking a union of the interim domains for each of the variables to determine the output domains (**Mackworth**, p 104, l 2-18; EN: disjunction follows with a node and a predicate to another node ... and the output follows from each path so determined with the output domain being the non repetitive summation ... such is the output from a graph; processor follows from artificial intelligence applications).

Claims 9, 22, 40, 53

Mackworth anticipates reducing the input domains comprises determining the output domains such that for any given value in the respective output domain of each of the variables, there exist values of the other variables in the respective output domains thereof that, together with the given value, constitute a solution to the set of relations (**Mackworth**, p 104, l 2-18; EN: the output follows from each path so determined with the output domain being a solution set; processor follows from artificial intelligence applications).

Claims 10, 23, 41, 54

Mackworth anticipates reducing the input domains comprises determining the output domains such that every set of values of the variables in the input domains that constitutes a solution to the set of relations is contained in the output domains of the variables (**Mackworth**, p 105, l 16-25).

Claims 11, 42

Mackworth anticipates receiving the set of relations comprises receiving a relation relating to at least three of the variables (**Mackworth**, p 104, l 18-24; EN: such is D_i, D_j, D_k and related variables).

Claims 12, 43

Mackworth anticipates receiving the set of variables comprises receiving variables that are characteristic of inputs to a system under test, and wherein reducing the input domains comprises determining values of the inputs to be made to the system based on the output domains of the variables (**Mackworth**, p 104, l 2-8; p 99, abstract; EN: Artificial Intelligence tasks include systems under test).

Claims 13, 44

Mackworth anticipates the system comprises an electronic processor, and wherein determining the values of the inputs comprises determining commands and addresses to be input to the processor (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks include systems under test related to an electronic processor which would have commands).

Claims 14, 45

Mackworth anticipates receiving the set of variables comprises receiving control parameters of a mechanical system, and wherein reducing the input domains comprises generating command to control the system based on the output domains of the parameters (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks includes control

parameters related to mechanical systems and generating command to control the system has to be based on the output).

Claims 15, 46

Mackworth anticipates receiving the set of variables comprises receiving features of an image containing visual information, and wherein reducing the input domains comprises identifying an object in the image based on the features (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks include identifying an object in the image based on features).

Claims 16, 47

Mackworth anticipates set of variables comprises receiving a natural language input, and wherein reducing the input comprises parsing the natural language, responsive to the output domains, so as to interpret the language (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks include language interpretation wherein the input is partitioned, interpreted and related to preceding output (domain)).

Claims 17, 48

Mackworth anticipates receiving the set of variables comprises receiving characteristics of a condition, and wherein reducing the input domains comprises determining a diagnosis of the condition based on the output domains (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks is problem solving based on a set of input characteristics wherein the domain reduction follows the solution).

Claims 18, 49

Mackworth anticipates the set of variables comprises receiving characteristics of resources whose use is to be scheduled, and wherein reducing the input domains comprises scheduling the use of the resources subject to the set of relations (**Mackworth**, p 99, abstract; EN: Artificial Intelligence tasks involve scheduling resources that are condition related).

Claim 24

Mackworth anticipates receiving a set of variables having respective input domains and a set of constraints comprising one or more relations defined as a combination of operators, selected from a group of arithmetic, bitwise and logical operators, which are applied to the variables (**Mackworth**, p 104, l 2-8); building a network of one or more hyper-arcs representing the set of constraints, each hyper-arc corresponding to one of the relations expressed in terms, of the operators and linking nodes in the network corresponding to the variables to which the operators are applied (**Mackworth**, p 104, l 2-6); and reducing the input domains of the variables in the network responsive to the operators, so as to determine respective output domains of the variables that are consistent with the set of constraints (**Mackworth**, p 104, l 2-6).

Claim 25

Mackworth anticipates receiving the set of constraints comprises providing a language for specifying theconstraints, the language having grammatical rules, and specifying the constraints using the language (**Mackworth**, p 116, l 16-39).

Claims 28, 59

Mackworth anticipates the operators comprise multi-variable operators, which receive two of more of the variables as their inputs (**Mackworth**, p 104, l 2-6; EN: such is $P_{ij}(x,y)$, artificial intelligence tasks implement processors).

Claims 29, 60

Mackworth anticipates multi-variable operators comprise one or more operators selected from a group consisting of addition, subtraction, multiplication, division and modulo operators (**Mackworth**, p 108, l 13-14; EN: addition is represented by concatenation; artificial intelligence tasks implement processors).

Claims 30, 61

Mackworth anticipates the multi-variable operators comprise one or more operators selected from a group consisting of an operator testing equality of two of the variables, an operator testing inequality of two of the variables, and an operator testing whether one of the variables is greater than another of the variables (**Mackworth**, p 109, l 8-10; artificial intelligence tasks implement processors).

Claims 31, 62

Mackworth anticipates one or more operators selected from a group consisting of a bitwise "and," bitwise "or" and bitwise "exclusive or" operations (**Mackworth**, p 109, l 1-2; EN: such is the implementation of binary multiplication; artificial intelligence tasks implement processors).

Claims 32, 50, 63, 64

Mackworth anticipates solving a constraint satisfaction problem, comprising a constraint processor, arranged to receiving a set of variables having respective input domains and a set of constraints comprising one or more relations among the variables, to build a network of one or more hyper-arcs representative of the set of constraints, each hyper-arc corresponding to one of the relations and linking nodes in the network corresponding to the variables that are subject to the relation and for each of the hyper-arcs, to assemble the variables in a hierarchy based on the relation corresponding to the hyper-arc, and to reduce the input domains of the variables in the hierarchy, so as to determine respective output domains of the variables that are consistent with the set of constraints (**Mackworth**, p 99, abstract; p 104, l 2-24; EN: artificial intelligence tasks use computers or processors; such is D_i, D_j, D_k and related variables of three or more).

Claim 33

Mackworth anticipates the hierarchy of the variables comprises a hierarchical graph, having vertices corresponding to the variables (**Mackworth,** p 104, l 2-8; EN: graphs have nodes and edges and are hierarchical).

Claim 34

Mackworth anticipates hierarchical graph has the form of one or more trees (**Mackworth,** p 102, l 1-3).

Claim 35

Mackworth anticipates the processor is arranged to reduce the input domains over each of the trees so as to find respective interim domains of the variables that are consistent with the relation over each of the trees, and to combine the interim domains over all of the trees to determine the output domains (**Mackworth,** p 102, l 1-3; p 104, l 2-18; EN: the output follows from each tree branch so determined to form the solution set).

Claim 36

Mackworth anticipates the set of constraints is defined as a combination of operators, selected from a group of arithmetic, bitwise and logical operators, which are applied to the variables, and wherein the graph comprises vertices corresponding to the operators, connecting the vertices corresponding to the variables (**Mackworth,** p 108, l 10-13; p 104, l 2-8).

Claim 37

Mackworth anticipates the processor is arranged to find projections of the operators onto the domains of the variables in the graph (**Mackworth,** p 108, l 10-13; p 104, l 2-8; EN: operators are in relations and relations tie the variables (nodes) together).

Claims 38, 58

Mackworth anticipates the set of variables comprises an output variable and at least one input variable for each of the operators, and wherein the processor is arranged to project the domain of the at least one input variable of each of the operators

onto the domain of the output variable thereof, and to project the domain of the output variable of each of the operators onto the domain of the at least one input variable thereof (**Mackworth**, p 99, abstract; p 104, l 2-8; EN: artificial intelligence tasks use computers or processors; projection is processing; relationships are between two variables).

Claims 55, 65

Mackworth anticipates apparatus for solving a constraint satisfaction problem, comprising a constraint processor, arranged to receive a set of variables having respective input domains and a set of constraints comprising one ormore relations defined as a combination of operators, selected from a groupof arithmetic, bitwise and logical operators, which are applied to the variables, to build a network of one or more hyper-arcs representative of the set of constraints, each hyper-arc corresponding to one of the relations expressed in terms of the operators and linking nodes in the network corresponding to the variables to which the operators are applied, and to reduce the input domains of the: variables in the network responsive to the operators, so as to determine respective output domains of the variables that are consistent with the set of constraints (**Mackworth**, p 99, abstract; p 107, l 12-29; p 104, l 2-24; p 109. l 1-2; EN: artificial intelligence tasks use computers or processors; inserting vertices would follow related constraints or operations since there is a connected relationship).

Claim 56

Mackworth anticipates wherein the constraints received by the processor are specified using a constraint-specification language having grammatical rules, and

wherein the processor is arrange to build the network automatically based on the constraints specified in the language (**Mackworth,** p 116, l 16-39; p 104, l 2-8).

Examination Considerations

7. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

8. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

9. Examiner's Opinion: Paras 7. and 8. apply. The prior art of Mackworth and the skill set of one of ordinary skill in the art anticipate the applicant's invention.

Conclusion

9. The prior art of record and not relied upon is considered pertinent to applicant's disclosure.

- Borduin, U.S. Patent 6,063,126
- Keyrouz et al, U.S. Patent 5,617,510
- Walser, U.S. Patent 6,031,984
- Kautz et al, U.S. Patent 5,636,328

10. Claims 1-65 are rejected.

Correspondence Information

11. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anthony Knight can be reached at (703) 308-3179.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

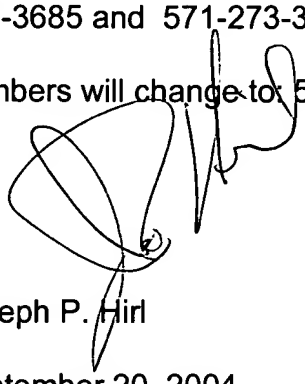
or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Note: During the last two weeks of October 2004, Art Unit 2121 will move to Carlyle, Randolph Building, 5th floor and my phone and fax number will change to: 571-272-3685 and 571-273-3685, respectively. Similarly, Anthony Knight's phone and fax numbers will change to: 571-272-3687 and 571-273-3687.



Joseph P. Hirl

September 20, 2004